INSTALLATION RESTORATION PROGRAM

Decision Document for Soil and Groundwater at the Old Fire Training Area, Site 1

144TH FIGHTER WING
CALIFORNIA AIR NATIONAL GUARD
FRESNO AIR TERMINAL, FRESNO, CALIFORNIA

HAZWRAP SUPPORT CONTRACTOR OFFICE
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Decision Document for IRP Site No. 1- Old Fire Training Area, California Air National Guard, 144th Fighter Wing, Fresno Air Terminal, Fresno, California. This report documents the data, conclusion, and recommendation to support a No Further Remedial Action Planned decision at Site 1 under the IRP.

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Draft Decision Document for Soil and Groundwater at the Old Fire Training Area, Site 1 144th Fighter Wing, California Air National Guard Fresno Air Terminal Fresno, California

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Andrews Air Force Base, Maryland

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1.0 Introduction

This decision document (DD) for Site 1 - the Old Fire Training Area (FTA) at the California Air National Guard (ANG) Base, Fresno, California (the Base), is being submitted under the requirements of the U.S. Department of Defense Installation Restoration Program (IRP) and the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by Superfund Amendments and Reauthorization Act.

1.1 Purpose

The objective of this DD is to provide technical rationale to support no further action at Site 1. Implementation of this recommended alternative would preclude any future remedial investigation/feasibility study (RI/FS) activities at the site.

Site 1 has been determined to pose no significant threat to public health or the surrounding environment based on evaluations of possible source areas, sampling data, pathways, and contaminant receptors. The information presented herein is a synopsis of activities and results of various stages of investigative work. Detailed evidence on which the decision for no further action is based can be found in its entirety in the Site Investigation (SI) Report, (IT Corporation [IT], 1992) and the Remedial Investigation Report, (IT, 1996).

1.2 Location

The California ANG leases approximately 140 acres of land from the City of Fresno on three different parcels inside the Fresno Air Terminal boundaries (Figure 1). Site 1 is in the Northeast portion of parcel A in the Southeast portion of the Terminal. The location of Site 1 at the Fresno Air Terminal is shown on Figure 1.

1.3 Environmental Setting

To better understand the rationale for the no further action decision at Site 1, the following paragraphs describe the environmental setting and possible migration potential in the vicinity of the site.

1.3.1 Climate

The climate is characterized by hot, dry summers and cool, moist winters. Mean monthly temperatures range from 46°F in December to 85°F in July. Winds are generally from the northwest. The average annual precipitation is less than 10 inches in the Fresno area. More than 90 percent of the yearly precipitation occurs between October and April. Yearly rainfall

(1)

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DRAFT. CHCK. BY: C.TUMLIN	ENGR. CHCK. BY: S.LOGAN
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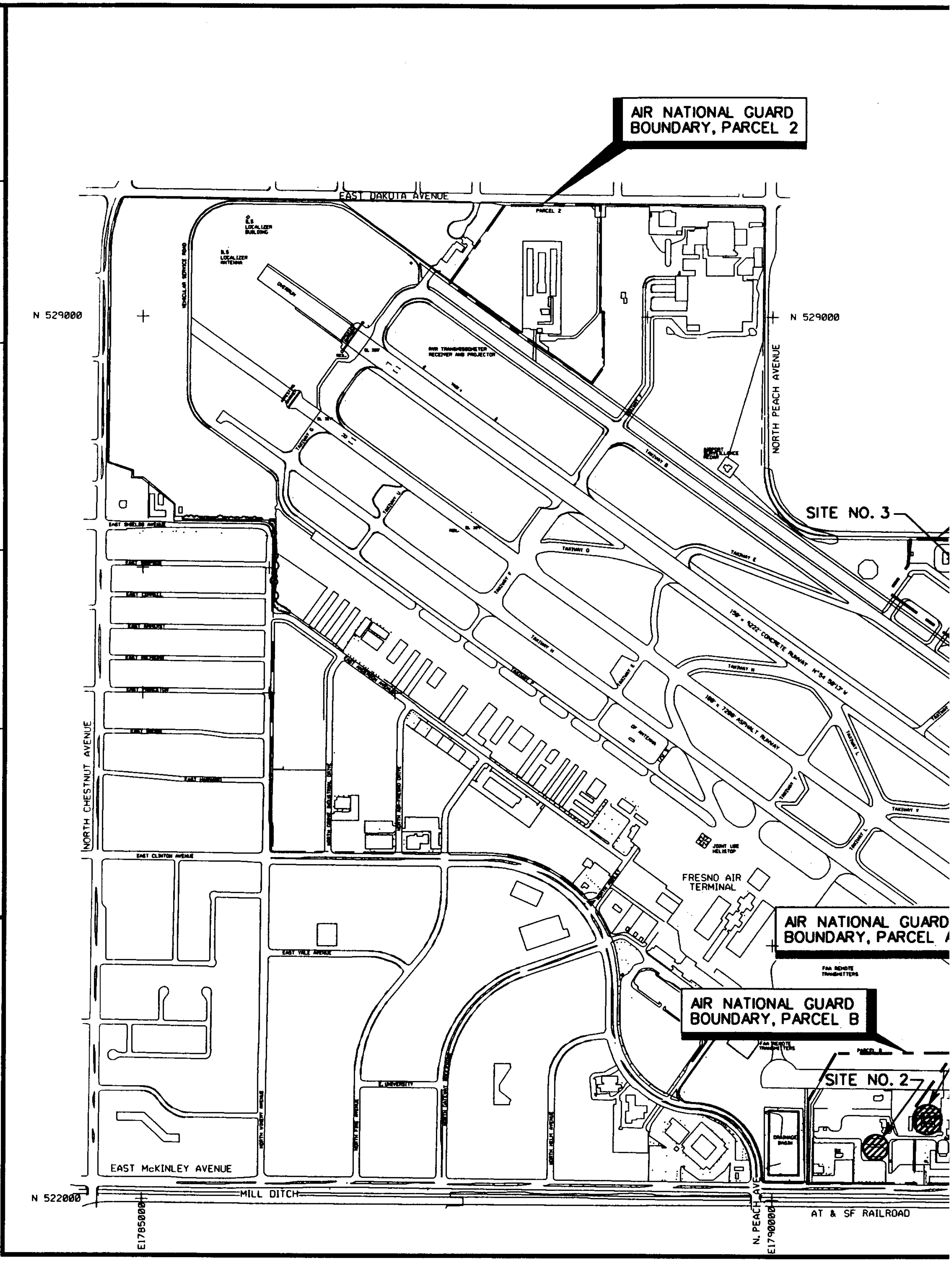

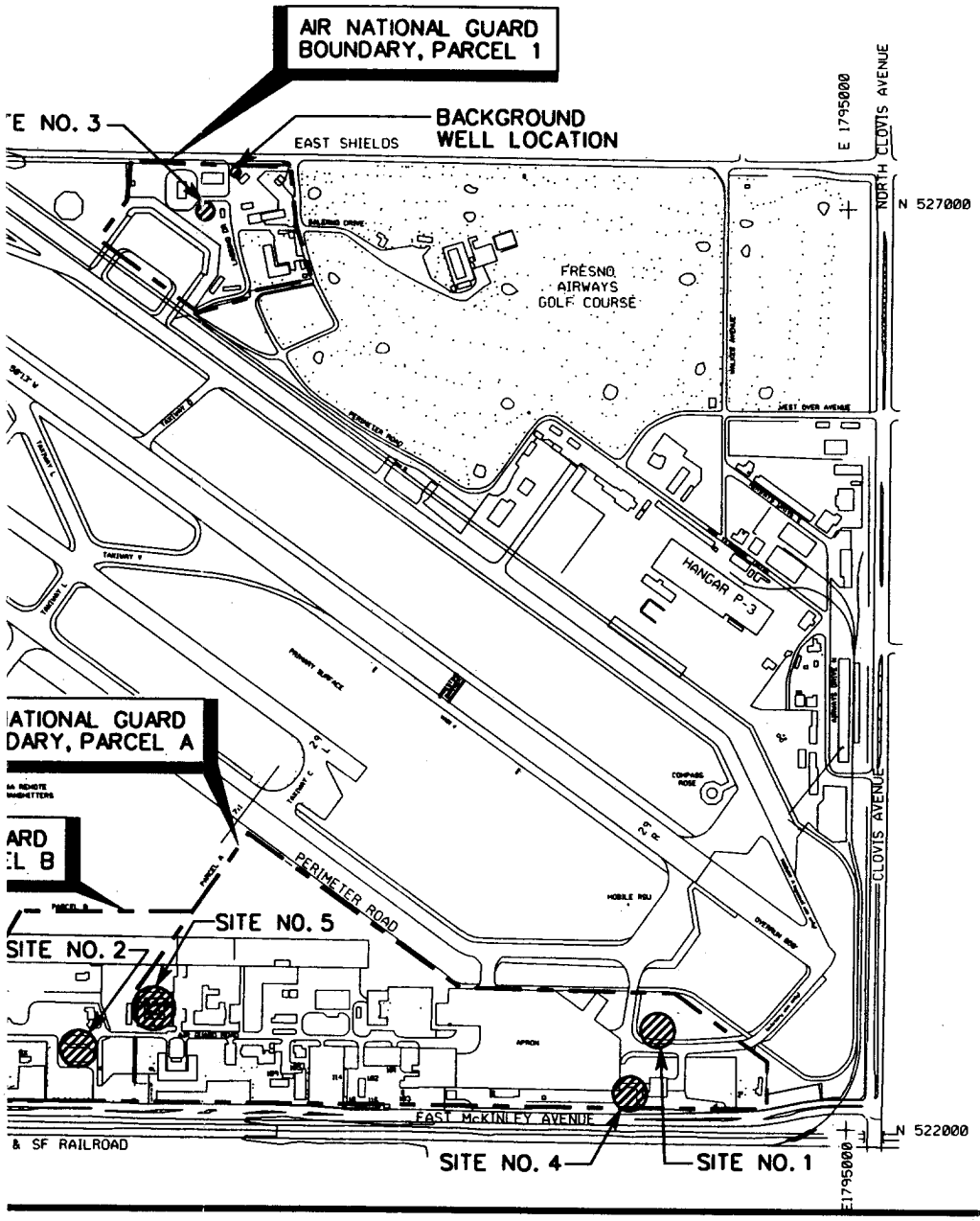

FIGURE 1
BASE MAP LOCATION OF IDENTIFIED INVESTIGATION SITES

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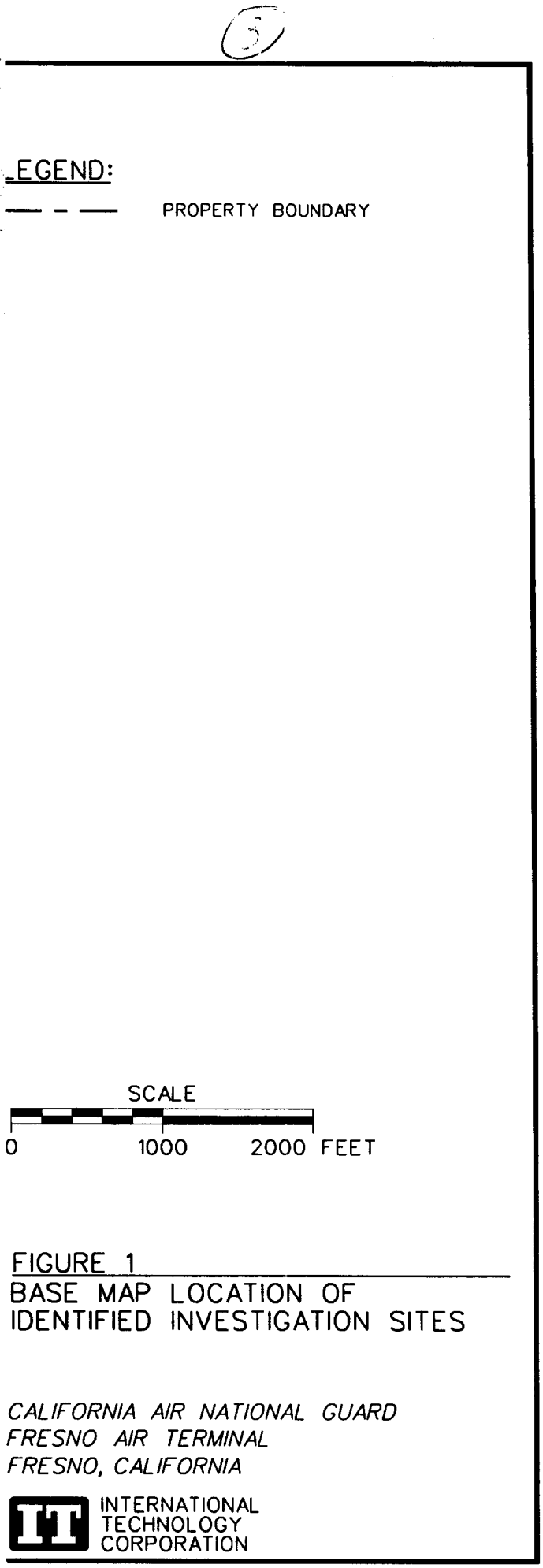

FIGURE 1
BASE MAP LOCATION OF
IDENTIFIED INVESTIGATION SITES

CALIFORNIA AIR NATIONAL GUARD
FRESNO AIR TERMINAL
FRESNO, CALIFORNIA

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varies widely from year to year and shows long-term wet and dry periods. The mean evaporation rate is 66 inches per year.

1.3.2 Geology

At the Base, the geology is characterized by alluvial fan deposits (Cehrs, et al., 1979). The fans have a low surface relief with very gentle gradients. Deposits in these fans are associated with an alluvial flood plain regime. Sediments in the fans range from clays to gravel, with finer sediments (silts and clays) associated with overbank and flood plain deposits, and coarser sediments (sands and gravels) associated with levee, crevasse splay, channel lag, and point bar deposits.

1.3.3 Hydrogeology

In the Fresno area, all municipal and rural domestic water is pumped from the alluvial aquifers. The aquifer system has been described as unconfined or semiconfined depending on local hydrogeologic conditions (Cehrs, et al., 1979; Steele, 1986). At the Base, the water table is approximately 80 feet below ground surface (bgs), sloping generally to the southwest. Groundwater flow through the alluvial sediments comprising the aquifer system beneath the Fresno area is controlled by the slope of the water table (to the southwest) and the occurrence of coarse-grained sediments within the alluvial fans. In the Fresno area, groundwater flows generally to the southwest and preferentially through coarse-grained channel deposits.

2.0 Background

The Air National Guard Readiness Center (ANGRC) instituted a comprehensive IRP to assess the extent of suspected chemical contamination that may have resulted from past handling and disposal practices at the Base. The ANGRC designed the IRP to generate data of sufficient quality during a SI that will support one or more of the following recommendations:

- Generate a DD recommending no further action
- Initiate a focused feasibility study/remedial measure
- Implement a remedial response
- Initiate a RI/FS.

Results of the investigation programs at Site 1 indicate that no further action is warranted at this site. General supporting information is presented in the following sections.

2.1 Site History

In April 1988, a preliminary assessment (PA) was completed by the Hazardous Material Technical Center (HMTC) (1988), focusing on past and present generation, use, handling, and disposal practices of hazardous waste and materials. Based on HMTC's findings, three suspect sites potentially contaminated with hazardous waste/hazardous materials were identified and were recommended for further IRP investigation. One such identified site included Site 1, The Old FTA.

Site 1 consisted of an unlined earthen berm surrounding a mock airplane and was used for Base fire training exercises from the late 1950s to the early 1970s. Materials that were burned for exercises included jet petroleum grade 4 (JP-4), aviation gas/fuel (AVGAS), and used petroleum, oil, and lubricants (POL) from Base shops. The approximate location of the FTA is in the U-shaped area formed by the taxiway, perimeter road, and the vehicular access area north of the hot brake area. The site was abandoned, covered with 3 to 4 feet of fill material, and subsequently graded.

After igniting the JP-4, AVGAS, and POL for fire training, the flames were allowed to burn until they began to die down. The flames were extinguished with a protein-based foam consisting of approximately 6 percent aqueous film-forming foam and 94 percent water. Sodium bicarbonate, also referred to as Purple K, was used as a dry chemical extinguisher. It was estimated that between 500 and 1,000 gallons of flammable material was used each month at the site.

2.2 Investigation Results

In 1990, an SI was conducted to confirm or deny the presence of contamination; to identify the presence and concentrations of specific chemical contaminants in both soil and in the uppermost water-bearing unit; to assess the geologic, hydrogeologic, and geochemical conditions at Site 1. Seventeen soil borings were drilled from which 52 soil samples were collected and analyzed for total petroleum hydrocarbons (TPH) (diesel fractions only), volatile organic compounds (VOC), total lead, and total organic lead.

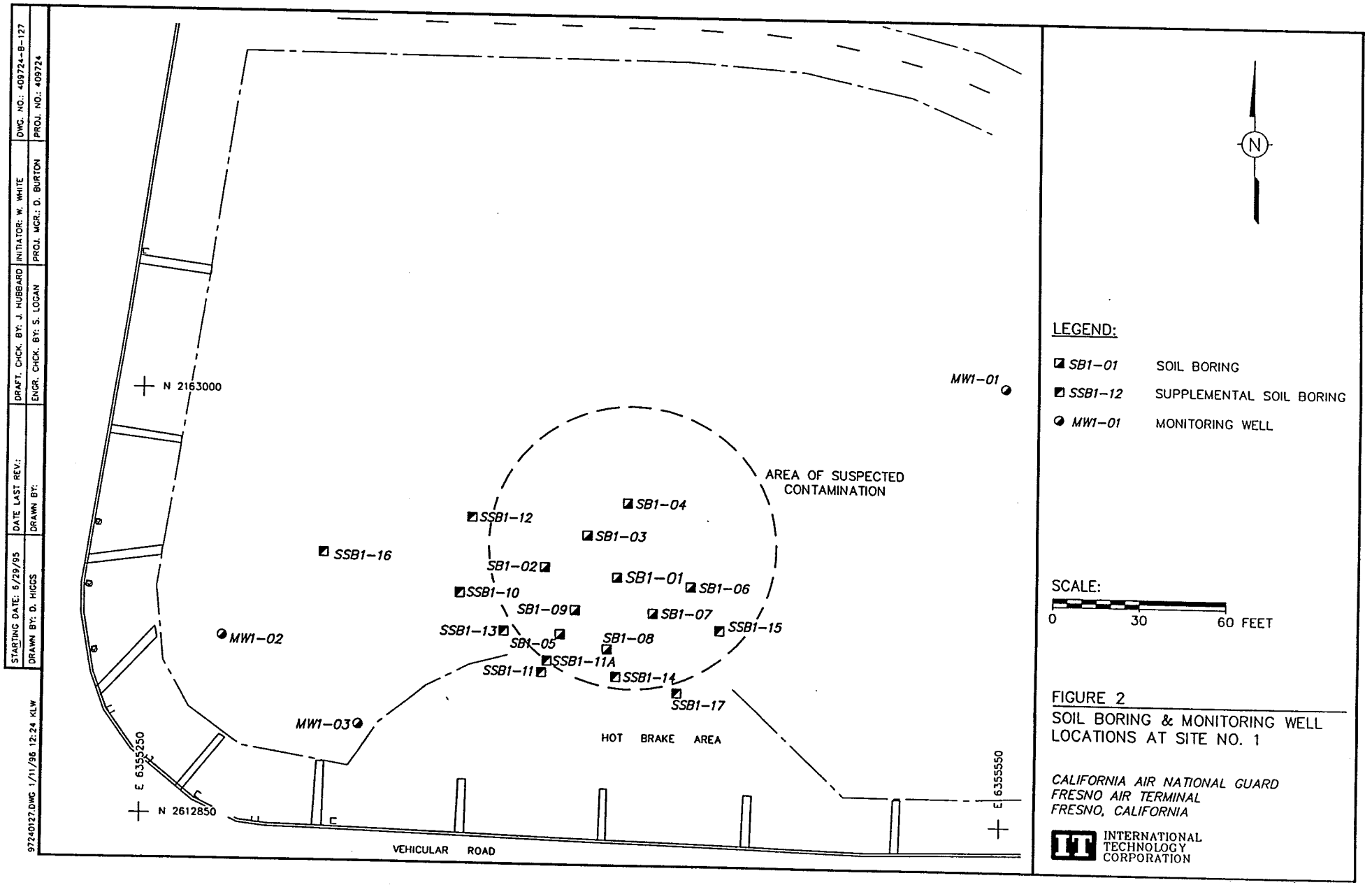
Data from three piezometers installed at Site 1 were used to construct preliminary groundwater contour maps and establish flow directions. Based on the flow direction, two monitoring wells were located hydraulically downgradient and one monitoring well was placed hydraulically upgradient of the site. Six groundwater samples were collected from these wells over a period from November 1990 to May 1993. Rationale and methodologies for the investigation were developed in the SI sampling and analysis plan for the Base (IT, 1990). Figure 2 shows the placement of the soil borings and monitoring wells. Comprehensive investigation information and results are incorporated in the SI Report (IT, 1992).

2.2.1 Soil Sampling Results

A total of 17 soil borings were installed at Site 1, from which 52 soil samples were collected. The initial nine borings were sampled to depths ranging from 50 to 60 feet bgs. Due to the absence of contamination below 40 feet, as indicated by the first nine borings, the final eight borings were targeted for total depths of 40 feet.

Analytical data discussed in this DD has been filtered through a process known as "blank correction," where field sample results are compared to results from quality control (QC) samples such as laboratory method blanks, equipment rinsate samples, etc. When analytes are found in both QC and field samples at similar concentrations, then the results from the field samples are attributed to contamination from sampling or laboratory procedures, and are not considered to represent site-related contamination. Because of the blank correction process, discussions of data results in this DD may not contain the exact data as listed in previous reports (such as IT, 1992 or IT, 1993). Comprehensive data summaries for Site 1 soil and groundwater samples are contained in the Remedial Investigation report (IT, 1996) as is a more detailed discussion of the blank correction process.

Of the samples collected at Site 1, six different volatile compounds were positively detected in the soil samples: 2-butanone, 4-methyl-2-pentanone, acetone, ethyl benzene, methylene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DWG. NO.: 409724-B-127
PROJ. NO.: 409724
97240127.DWG 1/11/96 12:24 KLW
N 2163000
N 2612850
E 6355250
E 6355550
MW1-01
MW1-02
MW1-03
AREA OF SUSPECTED CONTAMINATION
SB1-04
SSB1-12
SB1-03
SSB1-16
SB1-02
SB1-01
SB1-06
SSB1-10
SB1-09
SB1-07
SSB1-13
SB1-05
SB1-08
SSB1-15
SSB1-11A
SSB1-11
SSB1-14
SSB1-17
HOT BRAKE AREA
VEHICULAR ROAD
N
LEGEND:
SB1-01 SOIL BORING
SSB1-12 SUPPLEMENTAL SOIL BORING
MW1-01 MONITORING WELL
SCALE:
0 30 60 FEET
FIGURE 2
SOIL BORING & MONITORING WELL LOCATIONS AT SITE NO. 1
CALIFORNIA AIR NATIONAL GUARD
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FRESNO, CALIFORNIA
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chloride, and total xylenes. The VOCs were found in soil borings SB1-01, -05, -07, -08, -09, SSB1-11, -15, and -17.

The compound 2-butanone was reported in three samples collected at SB1-01. Concentrations ranged from an estimated 190 to 250 micrograms per kilogram (µg/kg) at depth intervals above 26.5 feet.

4-Methyl-2-pentanone was detected in 2 samples from boring SB1-01. Concentrations ranged from an estimated 34 to 71 µg/kg at depth intervals above 26.5 feet.

Acetone was reported in a total of 6 samples from three soil borings. The concentrations ranged from 220 to 1,800 µg/kg to depths no greater than 26.5 feet. Detected concentrations of acetone are below the residential preliminary remediation goal (PRG) of 2.9×10^6 µg/kg.

Ethyl benzene was reported in a single sample at a concentration of 4,600 µg/kg. This concentration is below the PRG of 2.9×10^6 µg/kg.

Methylene chloride was reported in two borings at concentrations ranging from 33 to 51 µg/kg from depths no greater than 25 feet bgs.

Total xylenes were found at elevated levels in the same samples that had toluene, but at higher concentrations in all cases. The concentrations ranged from 940 to 38,000 µg/kg at depths no greater than 20 feet bgs and as shallow as 4 feet bgs. The 980,000 µg/kg PRG for xylenes was not exceeded in any sample.

TPH (diesel) was detected with reportable concentrations in three borings at Site 1. The concentrations of TPH are all estimated. Levels of TPH (diesel) range from 1,530 to 3,500 milligrams per kilogram (mg/kg) from depths no greater than 20 feet bgs.

Soil samples collected from the 17 borings installed at Site 1 were submitted for analysis of total lead and organic lead. Total lead was detected in several samples from Site 1; however, concentrations did not exceed the level of 20 mg/kg indicated by the U.S. Geological Survey (1984) as being typical for the region. Each of these results is below the California PRG of 130 mg/kg for lead.

Organic lead was not detected in any Site 1 soil samples.

2.2.3 Groundwater Sampling Results

Three monitoring wells were installed (one upgradient and two downgradient) as part of the investigation to monitor groundwater quality from the uppermost water-bearing zone. Six groundwater samples were collected from the three wells over the monitoring history. Samples were collected in November 1990, February 1991, June 1992, October 1992, January 1993 and May 1993.

Groundwater samples collected from Site 1 were analyzed for VOCs, TPH (diesel), and total lead. Total lead and TPH (diesel) were dropped from the analytical suite after the June 1992 sampling event due to a lack of positive detections. No organic compounds that were detected in Site 1 soil was detected in groundwater samples collected from the three Site 1 monitoring wells.

The only organic compound positively reported in any of the analytical tests performed was trichloroethene (TCE). TCE was detected in MW1-01 at a concentration of 0.7 micrograms per liter (µg/L) in June 1992. TCE was detected in MW1-02 on three different sampling events. The presence of TCE is assumed to be due to regional groundwater contamination associated with past activities at Hammer Field/Fresno Air Terminal.

Lead, the only inorganic compound analyzed at Site 1, was detected at an estimated concentration only from MW1-02 at 1.1 µg/L during the November 1991 sampling event. This concentration of lead is below the 15 µg/L as specified in the U.S. Environmental Protection Agency's (EPA) maximum contaminant levels (MCL) for drinking water.

2.3 Risk Assessment Summary

A baseline risk assessment was conducted to quantify the risk to human receptors that may occur at Site 1 under various scenarios if no remedial actions are taken. A summary of findings from this evaluation are included in the following sections. A preliminary hazard evaluation for Site 1 is included in the SI report (IT, 1992) and a baseline risk assessment is included in Appendix J to the RI Report (IT, 1996).

Risks of exposure to chemicals of concern (COC) identified in Site 1 media were quantified for existing and predicted land use conditions. Exposure pathways evaluated for soils included incidental soil ingestion, dermal contact with soil and inhalation of dust from surface soils. For groundwater, exposure routes included ingestion, dermal contact and inhalation of

volatiles during household water use. A complete explanation of risk evaluation methods and selection of COCs is included in the RI Report (IT, 1996).

2.3.1 Risks Associated with Site Soils

A cumulative sum of the cancer and noncancer risks for the identified exposure pathways and chemicals detected at Site 1 exhibit risks below the target cancer range of 10^{-6} to 10^{-4}, and noncancer risks below the hazard index (HI) target of one.

Chemicals of potential concern (COPC) have been identified in the soils at Site 1 and were evaluated separately from chemicals detected in deeper layers of soil. Chemicals found within a depth of 3 feet from the surface (referred to as surface soil) were identified as COPCs for direct contact pathways.

Shallow soil samples (less than 3-foot depth) from Site 1 were found to contain lead and TPH (diesel). A cumulative sum of the cancer risk and Hazard Quotient for each of these pathways and chemicals observed at Site 1 exhibits a cancer risk below the target range of 10^{-6} to 10^{-4}, and all noncancer risk HI estimates below the target of one (1).

A simplistic leaching model was also used to conservatively estimate potential impacts to groundwater from organic contaminants in soil. Only methylene chloride found in the soils at Site 1, should it leach, might possibly produce concentrations slightly above the regulatory MCL of 5 µg/L for groundwater. It is recognized that methylene chloride is a common laboratory contaminant and that the low levels detected in soil (51 µg/kg) may be an artifact of the analytical procedures.

2.3.2 Risks Associated with Groundwater

Exposure risks for groundwater were evaluated for both those chemicals detected in Site 1 groundwater and for chemicals that may leach from the overlying soil. All cancer risk estimates for each exposure scenario were below the target risk range of 10^{-6} to 10^{-4}. No on-site receptor is above the total cancer risk across pathways or exceeded the upper limit of the target range (10^{-4}). Estimates for on-site receptor exposure were also below target levels. The sum of the risk from potential future groundwater conditions is at the lower range of the cancer target value of 10^{-6}.

TCE was the only organic compound reported in the groundwater at a concentration slightly above its detection limit. TCE is associated with regional groundwater contamination at the Fresno Air Terminal, and is not due to past site-related activities (ERM, 1994).

Lead was the only inorganic compound analyzed for and detected in Site 1 groundwater. It was estimated in only one sample between November 1990 to May 1993 at 1.1 µg/L from MW1-02, which is below the EPA's MCL for drinking water.

Due to the lack of significant and widespread concentrations of organic or inorganic constituents in the soil, and the lack of any chemicals in the groundwater, Site 1 does not present a threat to human health or the environment based on this evaluation.

3.0 Conclusions

Environmental sampling activities at Site 1 have confirmed limited contamination associated with past use of the fire training area. Chemicals detected in soil samples consist of high-boiling fuel hydrocarbons, xylenes, and other VOCs. Lead concentrations of 18.5 mg/kg were detected; however, this is below the threshold for health-based risk concentrations for lead. Risks evaluated for applicable and predicted exposure routes for chemicals detected in soil indicate that Site 1 does not pose a threat to human health or the environment.

Groundwater samples that have been collected indicate that the local groundwater conditions have not been adversely impacted by activities at Site 1 and there has been no significant difference observed between upgradient and downgradient conditions.

4.0 Recommendations

Based on investigation sampling results and risk quantification, it is recommended that Site 1 be removed from any further investigation, sampling, or risk-based analytical activities.

The ANGRC has reviewed the available data and recommends no further action under the IRP at Site 1, Old Fire Training Area, Fresno ANG Base.

DAVID C. VAN GASBECK
Chief, Environmental Division
Civil Engineer Directorate

28 May 96
Date

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